BROOKHAVEN NATIONAL LABORATORY

**Work Permit # DRL2009-17**
**Work Order # _____**
**Job# _____ Activity# _____**

**1. Work requester fills out this section.** ☐ **Standing Work Permit**

| | | | |
|---|---|---|---|
| Requester: Don Lynch | Date: 11/5/2009 | Ext.: 2253 | Dept/Div/Group: PO/PHENIX |
| Other Contact person (if different from requester): Carter Biggs | | | Ext.: 7515 |
| Work Control Coordinator: Don Lynch | | Start Date: 11/5/2009 | Est. End Date: 12/31/2009 |
| Brief Description of Work: Prepare IR for Run 10 | | | |
| Building: 1008 | Room: AH &IR | Equipment: PHENIX Detector | Service Provider: PHENIX Techs, C-A Techs, Various Trades |

**2. WCC, Requester/Designee, Service Provider, and ESS&H (as necessary) fill out this section or attach analysis**

**ESS&H ANALYSIS**

| | | | | | |
|---|---|---|---|---|---|
| **Radiation Concerns** | ☒ None | ☐ Activation | ☐ Airborne | ☐ Contamination | ☐ Radiation ☐ Other |
| ☐ Special nuclear materials involved, notify Isotope Special Materials Group | | | | ☐ Fissionable materials involved, notify Laboratory Criticality Officer | |
| **Radiation Generating Devices:** | ☐ Radiography | ☐ Moisture Density Gauges | | ☐ Soil Density Gauges | ☐ X-ray Equipment |

| **Safety and Security Concerns** | ☐ None | ☐ Explosives | ☐ Transport of Haz/Rad Material | |
|---|---|---|---|---|
| ☐ Adding/Removing Walls or Roofs | ☒ Critical Lift | ☐ Fumes/Mist/Dust* | ☐ Magnetic Fields* | ☒ Pressurized Systems |
| ☐ Asbestos* | ☒ Cryogenic | ☐ Heat/Cold Stress | ☐ Nanomaterials/particles* | ☐ Railroad Work |
| ☐ Beryllium* | ☐ Electrical | ☒ Hydraulic | ☐ Noise* | ☒ Rigging |
| ☐ Biohazard* | ☒ Elevated Work | ☐ Lasers* | ☐ Non-ionizing Radiation* | ☐ Security Concerns |
| ☐ Chemicals/Corrosives* | ☐ Excavation | ☐ Lead* | ☐ Oxygen Deficiency* | ☐ Suspect/Counterfeit Items |
| ☐ Confined Space* | ☐ Ergonomics* | ☒ Material Handling | ☐ Penetrating Fire Walls | ☐ Vacuum |
| * Industrial Hygiene (IH) Review Required | | | | ☐ Other |

| **Environmental Concerns** | ☒ None | ☐ Work impacts Environmental Permit No. | |
|---|---|---|---|
| ☐ Atmospheric Discharges (rad/non-rad) | ☐ Land Use Institutional Controls | ☐ Soil Activation/contamination | ☐ Waste-Mixed |
| ☐ Chemical or Rad Material Storage or Use | ☐ Liquid Discharges | ☐ Waste-Clean | ☐ Waste-Radioactive |
| ☐ Cesspools (UIC) | ☐ Oil/PCB Management | ☐ Waste-Hazardous | ☐ Waste-Regulated Medical |
| ☐ High water/power consumption | ☐ Spill potential | ☐ Waste-Industrial | ☐ Underground Duct/Piping |
| Waste disposition by: | | | ☐ Other |
| **Pollution Prevention (P2)/Waste Minimization Opportunity:** | ☒ No ☐ Yes | | |

| **FACILITY CONCERNS** | ☐ **None** | | |
|---|---|---|---|
| ☐ Access/Egress Limitations | ☐ Electrical Noise | ☐ Potential to Cause a False Alarm | ☐ Vibrations |
| | ☐ Impacts Facility Use Agreement | ☐ Temperature Change | ☐ Other |
| ☐ Configuration Control | ☐ Maintenance Work on Ventilation Systems | ☐ Utility Interruptions | |

**WORK CONTROLS**

**Work Practices**

| | | | | |
|---|---|---|---|---|
| ☐ None | ☐ Exhaust Ventilation | ☒ Lockout/Tagout | ☐ Spill Containment | ☐ Security (see Instruction Sheet) |
| ☐ Back-up Person/Watch | ☐ HP Coverage | ☐ Posting/Warning Signs | ☐ Time Limitation | ☐ Other |
| ☐ Barricades | ☒ IH Survey | ☐ Scaffolding-requires inspection | ☐ Warning Alarm (i.e. "high level") | |

**Personal Protective Equipment**

| | | | | | |
|---|---|---|---|---|---|
| ☐ None | ☐ Ear Plugs | ☒ Gloves | ☐ Lab Coat | ☒ Safety Glasses | |
| ☐ Coveralls | ☐ Ear Muffs | ☐ Goggles | ☐ Respirator* | ☐ Safety Harness | |
| ☐ Disposable Clothing | ☐ Face Shield | ☒ Hard Hat | ☐ Shoe Covers | ☒ Safety Shoes | ☐ Other |

**Permits Required** (Permits must be valid when job is scheduled.)

| | | |
|---|---|---|
| ☐ None | ☐ Cutting/Welding | ☐ Impair Fire Protection Systems |
| ☐ Concrete/Masonry Penetration | ☐ Digging/Core Drilling | ☐ Rad Work Permit-RWP No |
| ☐ Confined Space Entry | ☐ Electrical Working Hot | ☐ Other |

**Dosimetry/Monitoring**

| | | | |
|---|---|---|---|
| ☐ None | ☐ Heat Stress Monitor | ☐ Real Time Monitor | ☐ TLD |
| ☐ Air Effluent | ☐ Noise Survey/Dosimeter | ☐ Self-reading Pencil Dosimeter | ☐ Waste Characterization |
| ☐ Ground Water | ☐ $O_2$/Combustible Gas | ☐ Self-reading Digital Dosimeter | ☐ Other |
| ☐ Liquid Effluent | ☐ Passive Vapor Monitor | ☐ Sorbent Tube/Filter Pump | |

**Training Requirements** (List specific training requirements)

PHENIX Awareness, C-A Access, (where appropriate: Crane Operator, Confined Space, Rad Worker I, Fork lift Operator, Working at heights, Electrical Safety I, LOTO)

| **Based on analysis above, the Walkdown Team determines the risk, complexity, and coordination ratings below:** | | | | **If using the permit when all hazard ratings are low, only the following need to sign: ( Although allowed, there is no need to use back of form)** | |
|---|---|---|---|---|---|
| **ESS&H Risk Level:** | ☒ Low | ☐ Moderate | ☐ High | WCC: | Date: |
| **Complexity Level:** | ☒ Low | ☐ Moderate | ☐ High | Service Provider: | Date: |
| **Work Coordination:** | ☒ Low | ☐ Moderate | ☐ High | Authorization to start | Date: |
| | | | | (Departmental Sup/WCC/Designee) | |

**3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)**

| |
|---|
| **Work Plan** (procedures, timing, equipment, and personnel availability need to be addressed):<br>This work permit is a an overview for the tasks required to restore the PHENIX detector to operational readiness for run 10, scheduled to commence December1 , 2009. Detailed plans, procedures and responsibilities are outlined in the attached work plan. |
| Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)<br>Refer to attached sheet |
| Notifications to operations and Operational Limits Requirements: Refer to attached sheet |
| Post Work Testing, Notification or Documentation Required: Refer to attached shee |

| | |
|---|---|
| Job Safety Analysis Required: ☐ Yes ☒ No | Walkdown Completed (Required): ☒ Yes |

**Reviewed by:** Primary Reviewer signature means that the hazards and risks that could impact ESS&H have been identified, a Walkdown was completed and the hazards will be controlled according to BNL requirements.

| Title | Name (print) | Signature | Life # | Date |
|---|---|---|---|---|
| Primary Reviewer | | | | |
| ES&H Professional | | | | |
| Building Manager | | | | |
| Service Provider | | | | |
| Work Control Coordinator | | | | |
| Other | | | | |
| | Review Done: ☐ in series | ☐ team | | |

**4. Job site personnel fill out this section.**

| Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments). | | | |
|---|---|---|---|
| Job Supervisor: | | Contractor Supervisor: | |
| Workers: | Life#: | Workers : | Life#: |
| | | | |
| | | | |
| | | | |
| Workers are encouraged to provide feedback on ESS&H concerns or on ideas for improved job work flow. Use feedback form or space below. | | | |

**5. Department/Division Line Manager or Designee**

| Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.) | | | |
|---|---|---|---|
| Name: | Signature: | Life#: | Date: |

**6. Worker provides feedback.**

**Worker Feedback (use attached sheets as necessary)**

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See work planning and control subject area section 2.6.

**7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of work area to work supervisor.)** The WCC ensures that the change process to update drawings, placards, postings, procedures, etc. are initiated , if necessary.

| Name: | Signature: | Life#: | Date: |
|---|---|---|---|
| Comments: | | | |

**WP #: DRL-2009-17**

# PHENIX Preparations for Start of Run Checklist, November 2009

Introduction

The standard preparation-for-start-of-run tasks are to be performed in precisely the order indicated in the sequence of operations section below. These tasks are to be performed in accordance with the indicated PHENIX Procedures (where indicated) or otherwise best practices in accordance with BNL standards and training for "worker planned work", as appropriate. These tasks are to be accomplished in accordance with the latest startup preparation schedule as indicated in the current PHENIX technical support weekly planning meeting (see PHENIX Internal web site, systems engineering page for latest information). PHENIX technicians shall make certain that all of their required training is up to date, all equipment requiring certifications and/or calibration is up to date, and that all other equipment and tools are operating within normal operating parameters and in accordance with all BNL, CAD and PHENIX safety requirements.

BNL technicians and engineers shall also make certain that all non-BNL personnel working at PHENIX during the 2009 preparation for run 10 are appropriately trained for the tasks they will be performing, that all tasks have been properly reviewed and planned, and that all required permits are in place prior to commencement of such tasks.

(Note: There may be other work associated with operation, testing, maintenance, repair and upgrade of PHENIX detector systems and infrastructure being undertaken during the several weeks prior to COMMENCEMENT OF RUN 10. Such work may continue subject to the direction of PHENIX engineering and work coordinators. In the event that such work conflicts and/or might lead to a [potentially unsafe condition, either the work being performed under this work permit or the conflicting work will be temporarily interrupted as determined to be most appropriate by PHENIX engineering and work coordinators. Such other work shall be planned and coordinated, as appropriate, in separate work planning documentation.)

## Abbreviations

**AH – Assembly Hall**
**CAD – Collider-Accelerator Division**
**CM – Central Magnet**
**EC - East Carriage**
**IR – Interaction Region**
**MMN – North Muon Magnet**
**MMS - South Muon Magnet**
**MuID – Muon Identifier detector subsystem**
**TOF – Time of Flight detector subsystem**
**WC – West Carriage**

**Sequence of Operations**

1. Prepare IR for East Carriage Roll-in

    a. Move the CM to its home (run) position (PHENIX Techs, PP-2.5.5.1-01, PP-2.5.5.2-01)

    b. Connect CM magnet water cooling and magnet leads (CAD Techs)

    c. Move MuID collars into docking position adjacent to northeast end of south MuID panels (PHENIX Techs)

    d. Remove manlifts from IR (PHENIX Techs)

    e. Remove aluminum plates from IR (PHENIX Techs)

    f. Remove 12 ton cart from IR to AH (PHENIX Techs)

    g. Remove cart tracks from IR to AH

2. (These tasks are independent of task 1 and subtasks and may be performed simultaneously.) Prepare EC to move into AH.

    a. Disconnect shutdown temporary water, elect and fiber connections from EC (PHENIX Techs, PP-2.5.5.2-04)

    b. Fold and stow EC yellow platforms and handrails in preparation for move to IR (BNL Carpenters and Riggers under CAD engineering supervision)

    c. Make sure all potentially interfering items and debris are removed from EC path. (PHENIX Techs)

3. Move the EC to the IR. (PP-2.5.5.1-01, PP-2.5.5.2-01 )

4. Re-connect gas sniffers, water, elect., gas, fibers and RXNP umbilical (blue) cable from EC to bridge.

5. Install the MuID Collars (PP-2.5.5.4-25)

6. Un-Fold the EC platforms, re-install safety rails and reinstall the EC material lift and ladder (BNL Carpenters and Riggers under CAD engineering supervision).

7. Restore all PHENIX electronics currently in Summer shutdown safe modes to operating modes.

8. Re-connect EC lift wiring and TOF blower wiring (PHENIX electrician).

9. Assemble large rolling shield wall and base (BNL Riggers under CAD engineering supervision).

10. Close large rolling shield wall (PHENIX Techs, PP-2.5.5.2-02)

11. Request re-installation of radiation interlocks by CAD liaison engineer.

12. Perform magnet tests. (CAD Techs under CAD engineering supervision) (This step may be performed at any time after magnet leads and water cooling have been re-installed.)

13. Perform electrical, magnet and safety system checkout in accordance with CAD and PHENIX blue, pink and white checklist sheets. (PHENIX and CAD Engineers and Technicians in accordance with procedures referenced on checklist sheets.)

14. Start Watch shifts (PHENIX Run Coordinator)

15. Start Flammable Gas flow (PHENIX Technicians in accordance with Gas system operation procedures for each applicable detector subsystem.)

16. Detector subsystem commissioning (PHENIX Collaboration scientists in accordance with appropriate subsystem operating procedures.)

17. Ready for Run 10

Specific tasks for the 2009 preparation for Run 10 not covered herein start shall be individually evaluated for training requirements, permit requirements and planned in accordance with BNL standard practices.